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Science and Technology for Tomorrow's Aerospace Forces

Success Story

COMMERCIALIZING HIGH-POWER DIODE LASERS



The Directed Energy Directorate wanted to leverage its high-power diode laser technology into materials processing applications to help reduce the cost of these devices. Dr. John McKillop of Laser Fare, working with Dr. Chandra Roychoudhuri at the University of Connecticut and Dr. Efrim Portnoi at the Ioffe Institute in St. Petersburg, Russia, succeeded in developing grating coupled surface emitting lasers (GCSELs) that hold promise as low-cost, high-power laser diodes.



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Accomplishment

Infinite Photonics, Inc.'s (IPI's) proprietary (patent pending) GCSEL technology improved upon Laser Fare's basic GCSEL design. It uses a sophisticated, yet simple, design that simultaneously delivers higher average power, higher brightness (focusability), and lower cost than conventional high-power diode lasers. GCSELs are useable as signal sources in fiber optic communications, as "pumps" to provide energy for other solid-state lasers, to make printing plates in commercial digital printing, and as low-cost laser sources for materials processing.

IPI demonstrated GCSELs with output powers up to 8 watts (W) and expects to scale this design to at least 10 W. This is at least eight times more powerful and substantially brighter (more focusable) than current devices. These performance and cost advantages will allow GCSELs to dominate key applications in solid-state laser pumping, materials processing, and medicine.

Background

Laser Fare is a leading supplier of laser materials processing services to industry and the military. Laser Fare has long believed that high-powered laser diodes are a major force in materials processing, especially in the micromachining and marking areas.

IPI is a start-up company formed specifically to capitalize on unique high-power diode lasers that can readily dominate fast growing markets in materials processing, solid-state laser pumping, medicine, telecommunications, and printing. Based on the strength of its proprietary technology, management team, and unique world-class research and development capabilities, IPI hopes to be the dominant

Directed Energy
Technology Transfer

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTT, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (01-DE-20)